PATENT SPECIFICATION

DRAWINGS ATTACHED

860,090

Date of Application and filing Complete Specification:
May 6, 1957.
No. 33340/60.
Application made in France on May 7, 1956.
(Divided out of No. 860,089).
Complete Specification Published February 1, 1961.

Index at Acceptance: Classes 8(2), E; 122(1), B7(E2A:7C); 122(3), N1(B:G).
International Classification: F02g. F06j.

Improvements in and relating to sealing means.

COMPLETE SPECIFICATION

We, REGIE NATIONALE DES USINES RENAULT, a French Body Corporate, of 8/10 Avenue Emile Zola, Billancourt, Seine, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly decribed in and by the following statement:

This invention relates to a sealing means between fixed or relatively movable co-axial cylindrical members in the presence of a fluid under pressure.

According to the invention there is provided a sealing means between fixed or relatively movable co-axial cylindrical members in the presence of a fluid under pressure, comprising a packing of elastic material mounted in a groove in one of said members and having on a given side two divergent flexible sealing lips applied respectively in tension against each of said members, said packing having a body of generally toric form and the lip contacting said one of said members being axially shorter than the other lip.

Thus in a sealing means according to the invention the body of the packing will provide a guiding or centering means for the two co-axial cylindrical members and the flexible lips will be applied, one to each of said members, by the pressure of the fluid to form a reliable fluid-tight seal. Moreover, the shorter sealing lip, when the packing is applied in its groove, will tend to rock the generally toroidal body about its axis and thus reinforce the application of the longer lip against the other member.

Preferably the shorter lip is splayed more greatly than the longer lip, when the packing is not in position.

When the sealing means is used in a piston and cylinder arrangement the flexibility of the lips permits the seal to be maintained even if the cylinder size lies outside the permitted tolerances or if the cylinder is somewhat oval or not perfectly straight. Moreover, since the body of the packing is compressible it will guide the piston in its movement without causing jamming at any tight spots in the cylinders.

It should be noted that packings intended for high working pressures should have smaller lips than packings intended for low working pressures. Since the lips are pressed against the cylindrical members by the pressure of the fluid it will be seen that a large contact surface with high pressure of the fluid would give rise to a considerable resistant force which would detract from the efficiency of the appliance in which the sealing means is used.

Specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figures 1 and 2 are vertical sections of a piston packing, vulcanized before fitting and then fitted on the piston,

Figures 3 and 4 are similar views of a modified embodiment,

Figures 5 and 6 are similar views of a static assembly joint by itself and then fitted in its seating and

Figure 7 is a longitudinal section of a pneumatic jack fitted with packings.

Figures 1 and 2 show a piston packing having two lips 41 and 42 of unequal length articulated to a toris body 43. A circular fillet 44 made on the engaged face of each of the lips 41 and 42 adjacent their point of connection with the body 43 co-operate with an internal circular fillet 45 to ensure a certain amount of mobility to the sealing of the lips. The inclination of the two lips is such that once the packing is placed in position on a piston 46 in a cylinder 47, the said packing forces, by resilient tension, the inside lip 42 against the piston 46. This causes a resultant tension in the packing which applies the outside lip

41 against the wall of the cylinder 47.

It will be seen that driving fluid in the space 48 absolutely cannot pass beyond the packing whose fluid-tightness is ensured by its own tension and by the pressure exterted by the fluid on the two lips.

As will be seen from Figure 2 the body 43 of the packing serves to guide and centre the piston 46 in the cylinder 47. Cut-outs 49 may be provided on the body 43 and will permit the passage of fluid in the direction 50, so that the packing can act as a check valve.

Figures 3 and 4 represent a modification of the above-mentioned packing, according to which beadings 51 and 52 are provided on the application surfaces of the lips 41 and 42 adjacent their point of connection with the body 43. The beadings 51 and 52 are arranged so that when the lips 41 and 42 are in position, (Figure 4) said beadings contact each other between the lips 41 and 42 and will cooperate with the body 43 in centering the piston in the cylinder, while leaving the lips 41 and 42 their own mobility in order to increase the seal.

There may also be provided, to locate the position of the packing, in its bore 53 a groove 55 which groove engages a circular beading 54 on the piston, this arrangement contributing to increase the freedom of action of the lips. The grooves 56 between the beading on the sliding face of the packing particularly contribute to the lubrication by retaining a small quantity of the lubricant, thus facilitating the sliding of the piston.

Figures 5 and 6 represent an application to a static toric joint of known type, consisting of the addition of two flexible lips 62 and 63 of reduced dimensions which assist in stabilising the position of the joint in its seating and to ensure complete fluid-tightness at the contact surface, even in the case of a poor surface finish.

Figure 5 shows the relative inclination of the lips. The outside lip 62 is of slightly larger diameter than the cylinder used, sufficiently so to create a tension, but not excessively so to the extent of creating folds which might cause leakages.

On the other hand, the inside lip 63 is considerably splayed so that when brought into working position (Figure 6), it is applied with a high tension to the bottom of its seating and hence obtain increased fluid-tightness without risking the formation of folds. Furthermore, this method of fitting under tension accentuates the pressure of the outside lip in the cylinder.

In Figure 7 is represented an application of the packings according to the invention in the frame of a pneumatic jack with a rod outlet and two shock absorbers.

The cylinder 64 of the jack is closed at one end by an end-piece 65 and at the other end by the end-piece of a stuffing-box 66. A piston 67 is fixed on a rod 68 by a thread 69 and a peened-over end 70.

The packings 71, 72 of the piston and the packings 73 and 74 of the shock absorbers are those represented in Figures 1 and 2. The combination should be noted of the packings 71 and 72 fitted in opposite directions with a view to obtaining bilateral fluid-tightness of the piston in its cylinder, and the additional use of the shock absorber packings 73 and 74 as valves, by the provision of grooves on the body portion.

In order to ensure the correct centering of the piston in the cylinder, there is introduced an annulus 75 of a similar material to that of the packings. Any risk of crushing the packings 71 and 72 is thus avoided, particularly when the jack is placed horizontally, and the result is increased efficiency and working life for the packings. Two or more annuli may be used, according to the weight of the piston.

In certain cases the annulus 75 may be dispensed with if the package 71 and 72 are replaced by those of the type represented in Figures 3 and 4, which stand up better to the lateral forces, thanks to the exra beadings with which they are provided.

A stuffing-box packing 76 is fixed in a circular seating 61 so that its end beading 60 comes into contact with a gland nut 77.

The end-piece assembly packings 78 are of the type shown in Figures 5 and 6.

WHAT WE CLAIM IS:—

1. A sealing means between fixed or relatively movable coaxial cylindrical members in the presence of a fluid under pressure, comprising a packing of elastic material mounted in a groove in one of said members and having on a given side two divergent flexible sealing lips applied respectively in tension against each of said members, said packing having a body of generally toric form and the lip contacting said one of said members being axially shorter than the other lip.

2. A sealing means as claimed in claim 1, wherein the shorter lip is splayed greatly than the longer lip, when the packing is in position.

3. A sealing means as claimed in claim 1, wherein a circular fillet is provided at the base of each lip at the point of connection between said lip and the body of the packing.

4. A sealing means as claimed in claim 1, or claim 2, wherein the lips each have a circular beading near their point of attachment to the body of the packing, said beadings being intended to back up against one another when the packing is fitted and

to form an auxiliary body which is compressible between the said members.

5. A sealing means as claimed in claim 4, wherein the body of the packing and the auxiliary body leave between them a circular groove intended to co-operate in keeping in position the packing in its seating groove, said circular groove engaging for this purpose on a circular rib provided in said seating groove.

6. A sealing means substantially as hereinbefore described with reference to and as illustrated in Figures 1 and 2 or Figures 3 and 4 or Figures 5 and 6 of the accompanying drawings.

7. A pneumatic jack having sealing means as claimed in claim 1, substantially as hereinbefore described with reference to and as illustrated in Figure 7 of the accompanying drawings.

REGIE NATIONALE DES USINES RENAULT.
Per: BOULT WADE & TENNANT
111/112, Hatton Garden, London, E.C.1.
Chartered Patent Agents.

Sheerness: Printed for Her Majesty's Stationary Office, by Smiths, Printers and Duplicators.—1961.
Published at the Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

Fig. 1

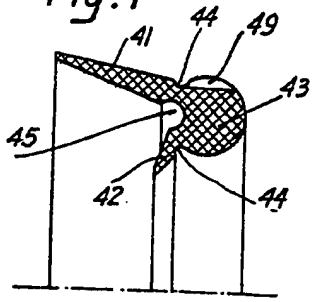


Fig. 3

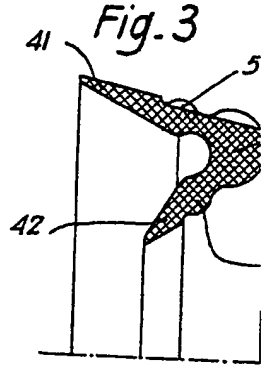


Fig. 2

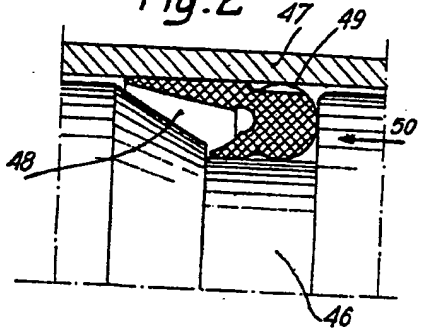


Fig. 4

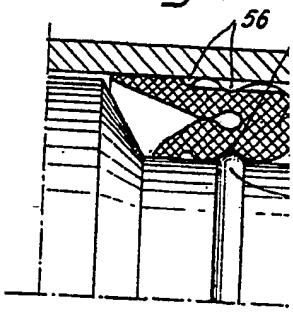
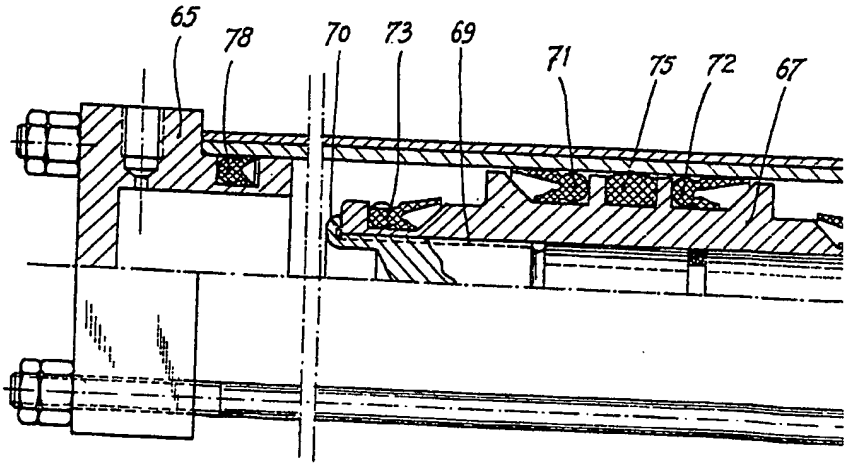


Fig. 7



860,090 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

Fig. 3

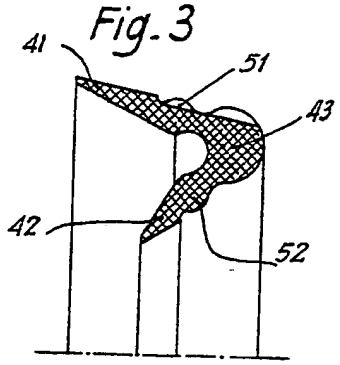


Fig. 5

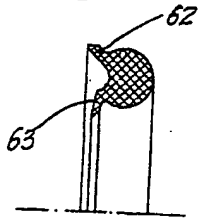


Fig. 4

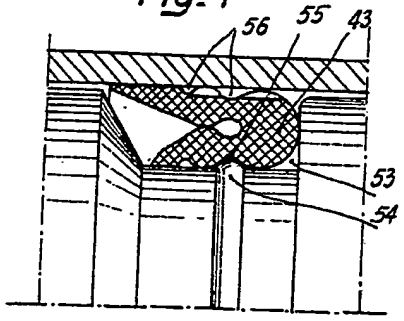


Fig. 6

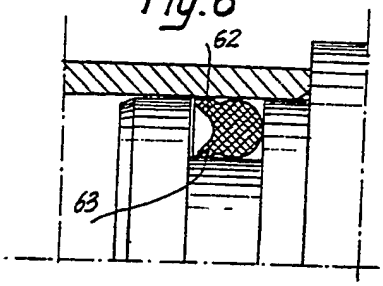


Fig. 7